

REMARKS

This amendment is submitted in response to the Office Action mailed September 15, 2002. Claims 1-13 and 19-24 have been canceled and not entered. Claim 25 is canceled and new Claims 26-31 are added with this Amendment. Support for new Claims 26-31 can be found in the specification and drawings, for example, at pages 11-13 and FIGS. 6-9. Claims 14-18 and 26-31 are pending in this application.

Double Patenting:

Claim 25 is rejected under 35 U.S.C. 101 as claiming the same invention as that of Claim 13 of U.S. Patent No. 6,610,150.

Claim 25 is hereby canceled.

Claim Rejections under 35 U.S.C. 103:

Claims 14, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,364,222 to Akimoto ("Akimoto"). Applicant respectfully traverses these rejections.

As the Examiner is aware, to establish a prima facie case of obviousness under 35 U.S.C. 103(a), first, there must be some suggestion or motivation, whether in the references themselves, or in the knowledge generally available to one of ordinary skill in the art to modify the reference teaching. Second, there must be a reasonable expectation of success. Third, the prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. Applicant respectfully submits that a prima facie case of obviousness is not established and Claims 14 and 17-18 are patentable over Akimoto.

Claim 14 is directed to a semiconductor wafer process apparatus comprising a dual-wafer single-axis transfer arm adapted to carry and transfer semiconductor wafers between a loadlock chamber and a semiconductor wafer process chamber. The transfer arm has a monolithic arm pivotally mounted within the loadlock chamber about a single pivot axis and is adapted to carry at least two wafers simultaneously between the loadlock and the process chambers.

Akimoto does not teach or suggest the wafer process apparatus as defined in Claim 14. Akimoto teaches a robot 30 that is very different from the apparatus comprising a dual-wafer single-axis transfer arm as recited in Claim 14. As shown in Figures 1-3 and described in Cols. 3-4 in Akimoto, robot 30 travels along a transfer path 31 and transfers wafers between wafer carrier 2 and process chamber 20. Robot 30 has an arm 35 that is movable vertically along shaft 33 and forward and backward horizontally by a driving mechanism disposed in block 34. However, arm 35 is not a *dual-wafer single axis* transfer arm. Arm 35 is simply a plate 41 with suction holes 42 in the plate. Nor is arm 35 has a monolithic arm *pivotally mounted within a locadlock chamber and pivots about a single pivot axis*.

Robot 30 of Akimoto has two forks 36 and 37. However, as shown in Figure 4, forks 36 and 37 are separately connected to block 34, but they are not elements of arm 35. In other words, arm 35 and forks 36 and 37 work independently, rather than as a dual wafer single axis *monolithic arm* as recited in Claim 14 of the present invention. At Col. 3, lines 52-58, Akimoto teaches that:

As is schematically shown in FIG. 4, the arm 35 and forks 36 and 37 are coupled to driving means in the block 34 via associated support frames 35a, 36a and 37a. Thus, *the arm 35 and forks 36 and 37 are independently movable in a horizontal direction* (indicated by arrow A in FIG. 3). (emphasis added)

At Col. 4, lines 38-52, Akimoto further teaches that:

The arm 35 is moved vertically and also moved forward and backward by the driving mechanisms in the carriage table 32 and block 34, *thereby taking out a non-processed wafer W from the carrier 2*. The arm 35 holding the wafer W is moved to the transfer table 5 below the carrier 2, and the arm 35 loads the wafer W on the table 5.

Next, the fork 36 or 37 is moved and holds the wafer W on the table 5. Subsequently, the robot 30 is moved to the processing unit 20 (i.e. the resist liquid coating unit 21 or developing liquid coating unit 22). The fork 36, 37 is moved vertically and moved forward and backward by the driving mechanisms in the carriage table 32 and block 34, *thereby transferring the wafer W to the processing unit 20*. (emphasis added)

Thus, it is clear that even robot 30 as a whole (instead of arm 35) is deemed as a transfer arm by the Examiner in the Office Action, robot 30 is very different from the dual-wafer single axis transfer arm as recited in Claim 14, at least in that arm 35 and forks 36 and 37 work independently and separately, and the robot 30 does not have a dual-wafer single axis *monolithic arm* pivoting about a single axis.

Therefore, Applicant respectfully requests reconsideration of the rejections of Claims 14 and 17-18 under 35 U.S.C. 103(a) over Akimoto.

Allowable Subject Matter and New Claims 26-31:

Applicant acknowledges with appreciation the Examiner's indication that Claims 15 and 16 contain allowable subject matter.

New Claim 26 is added to incorporate the features of Claim 14 and the allowable subject matter recited in Claim 15, i.e., the transfer arm has a retracted home position and an extended position in which the transfer arm extends into the process chamber, wherein the single pivot axis allows the transfer arm to pivot between the retracted and extended positions.

New Claims 27-28 further recite that the apparatus comprises a cooling plate and a plurality of lift pins in the cooling plate.

New Claim 29 further recites that the transfer arm comprises an end effector.

Applicant has also reviewed the references cited but not relied upon by the Examiner in the Office Action, including U.S. Patent No. 5,518,542 to Matsukawa, U.S. Patent No. 5,612,068 to Kempf, U.S. Patent No. 5,893,699 to Dadiomov, and U.S. Patent No. 6,585,478 to Wood.

Katsukawa teaches a double-sided substrate cleaning apparatus including a carrier station for loading/unloading a carrier and a convey mechanism for conveying an object taken out from the carrier stations.

Kempf teaches an apparatus for transferring substrates from an initial station through several process stations.

Dadiomov teaches an apparatus for aligning an end effector that is attached to a robotic arm of a disk certification system.

Wood teaches a robotic semiconductor handling system including two robot arms.

None of the above cited references teach or suggest a dual-wafer single axis transfer arm as recited in the claims of the present invention.

Based on the foregoing, Applicant respectfully submits that the application is now in condition for allowance. If any matters can be resolved by telephone, the Examiner is invited to call the undersigned attorney at the telephone number listed below. The Commissioner is authorized to charge any additional fees to Deposit Account No. 50,2319 (Order No. A-67736-2/MSS(463035-481)).

Respectfully submitted,



Tianjun Hou

Reg. No. 51,821

Dorsey & Whitney LLP
4 Embarcadero Center, Suite 3400
San Francisco, CA 94111-4187
Telephone: (650) 494-8700
Facsimile: (650) 494-8771

1068206